



# STATE OF TENNESSEE

## Nutrient Optimization Update

### 2016

04/21/2016

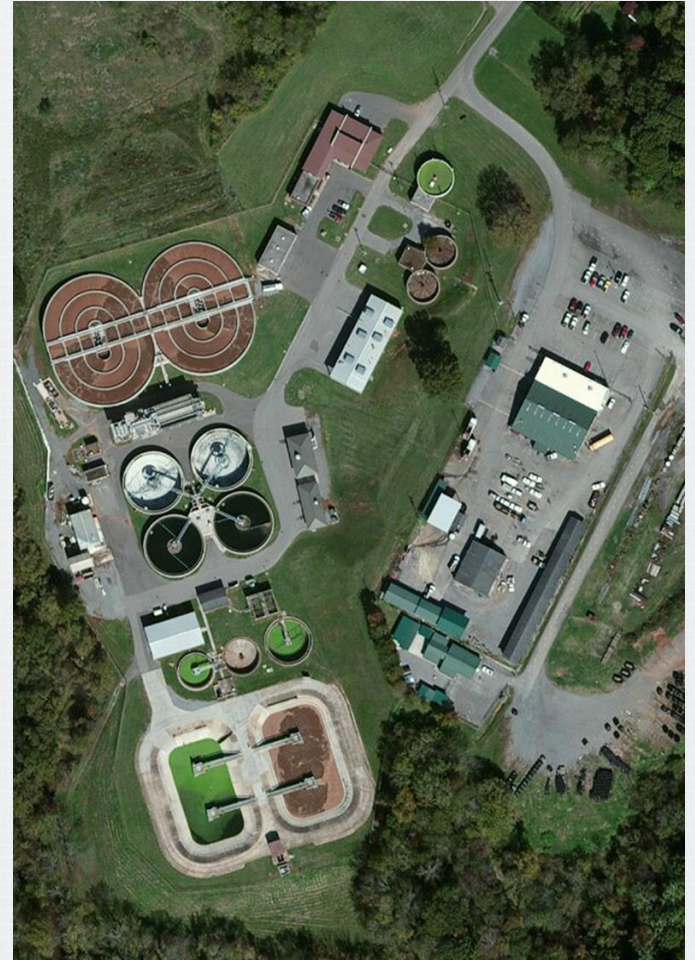
# Optimization Foundations

- By understanding what makes bacteria thrive...
- Knowing a bit about technology...
- And, being willing to experiment...
- Most any treatment plant can work better: BOD, TSS, Nitrogen & Phosphorus Removal.
- At little to no cost.
- Even realizing savings



# Resources Needed

- Scientific curiosity
- Professional pride
- Respect for ratepayers
- Instant data
- Adjustable equipment
- Automated controls
- Executive champion
- Regulatory support

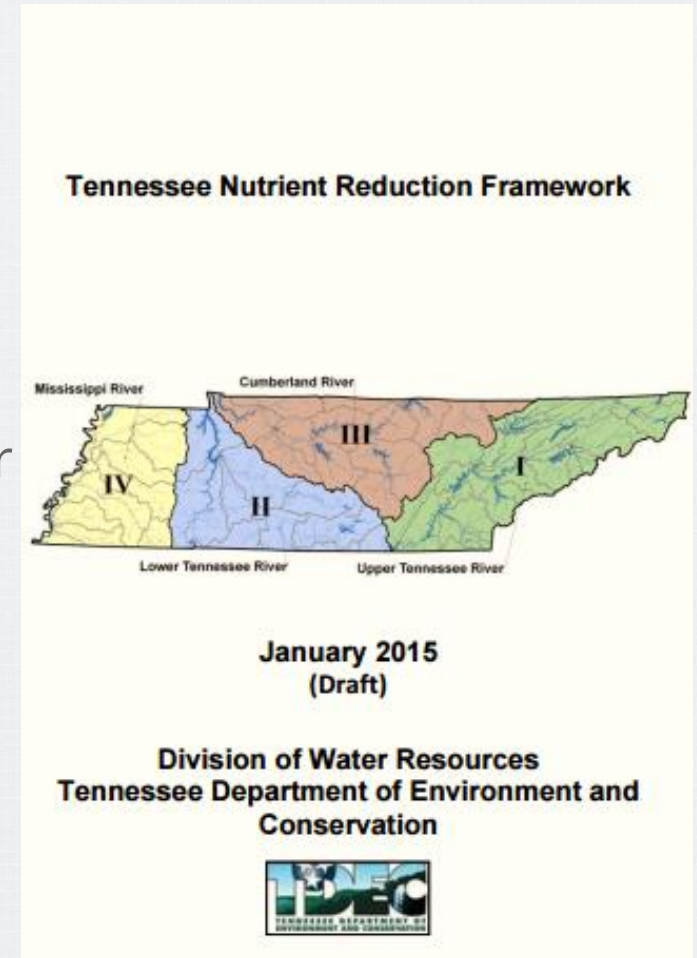




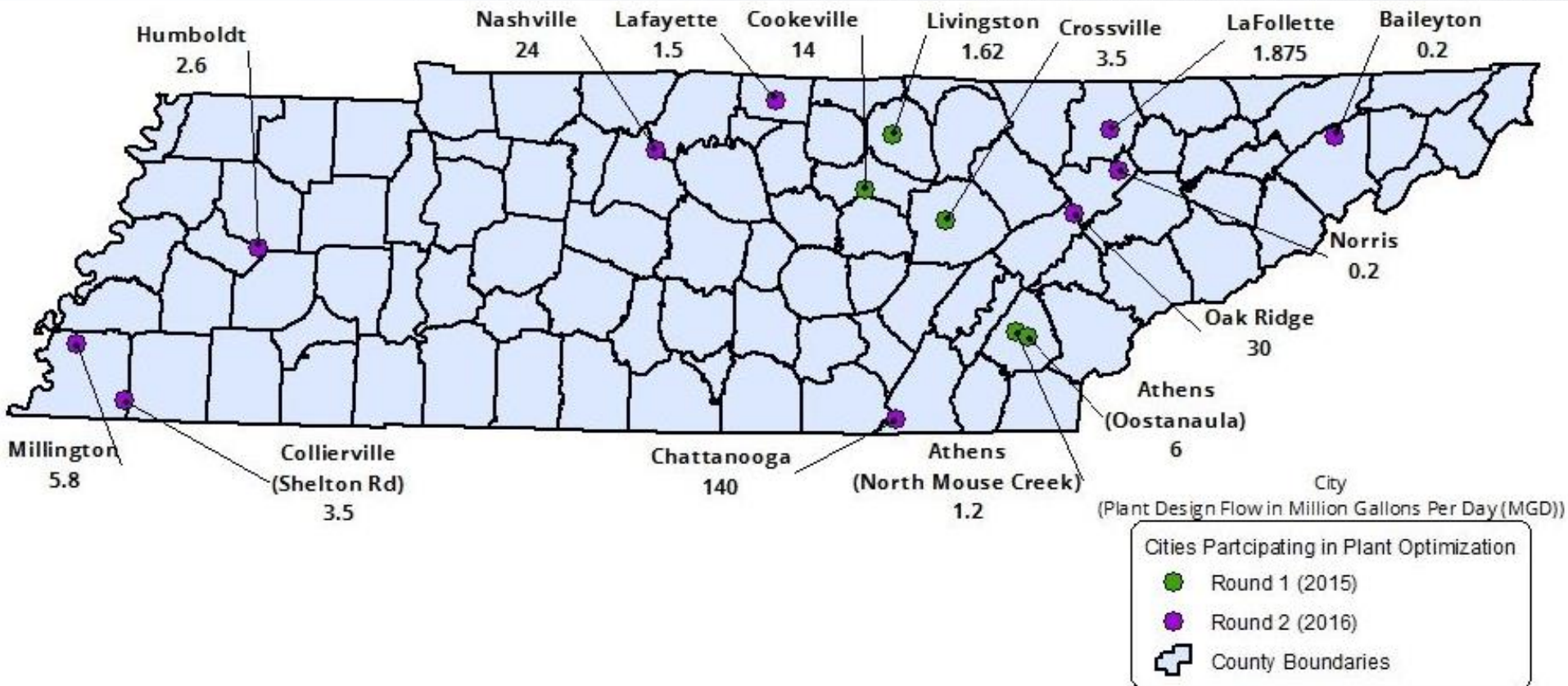
# Tennessee Experience

- MTAS, TAUD – Brett Ward, Dan Martin
- Energy Audits – Larry Moore, Brett Ward
- Water Planet Company - Grant Weaver
- Consulting Companies – Permits

<https://www.tn.gov/environment/article/wr-ws-tennessee-nutrient-reduction-framework>



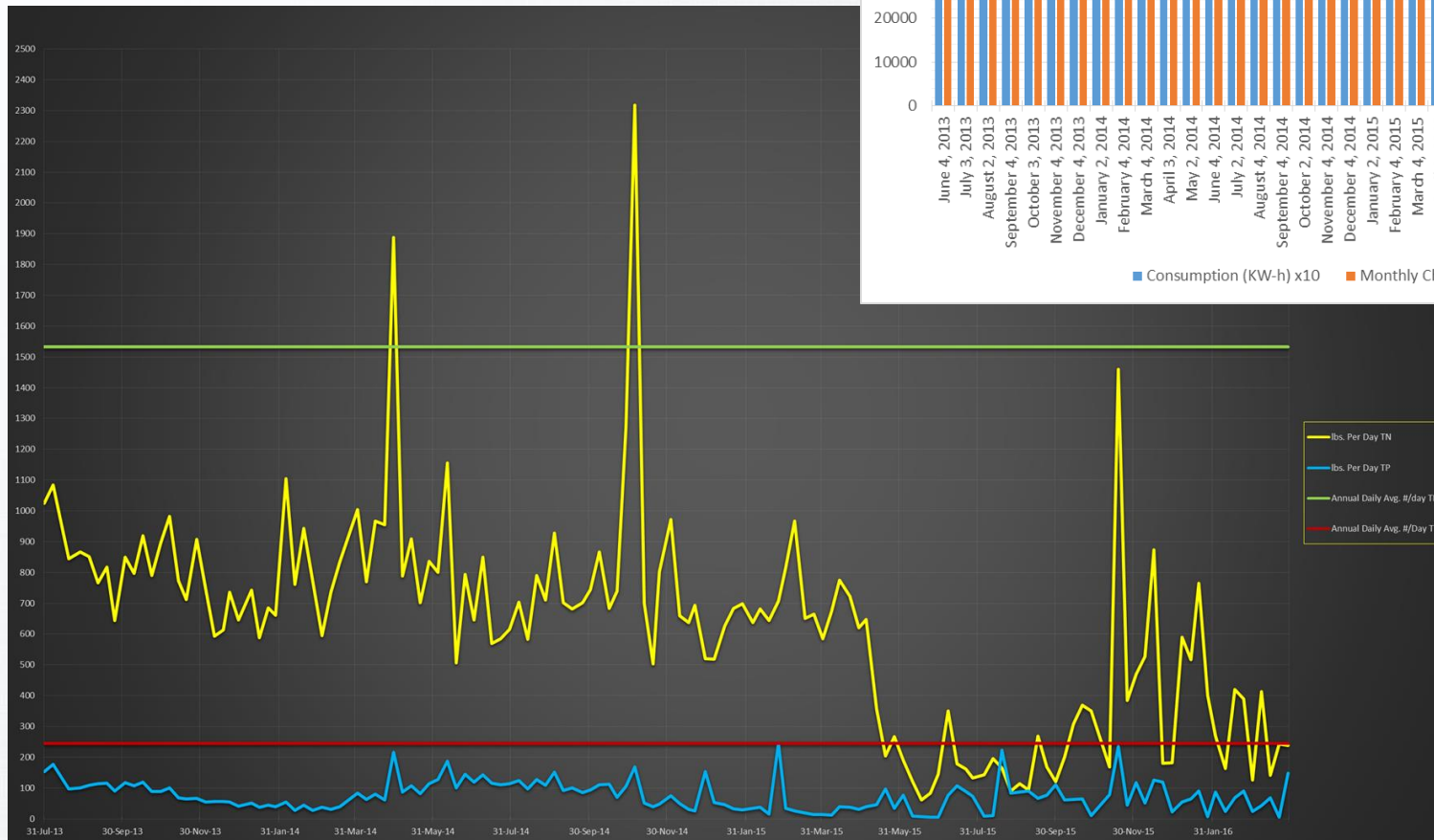
# Optimization Update



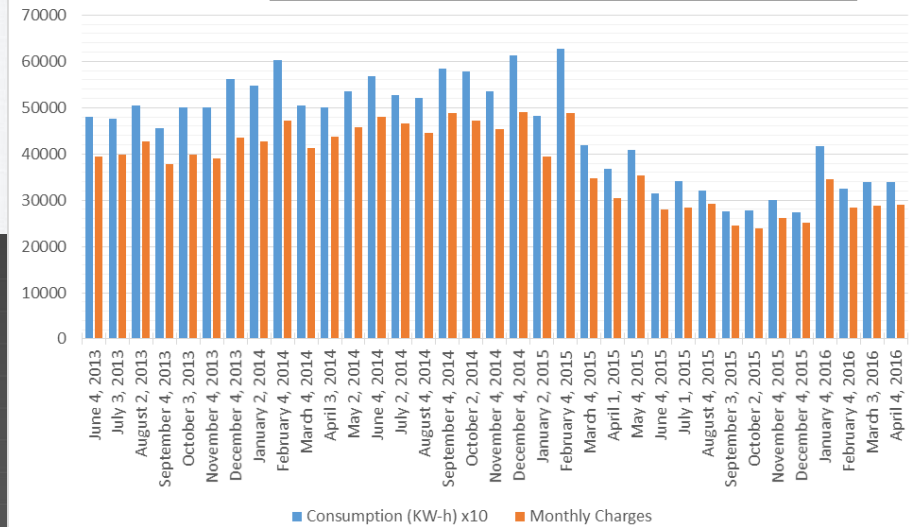
# Results Review

	Athens North Mouse Creek		Athens Oostanaula		Cookeville		Crossville	Livingston	
Site Visits/ Months	2/ 5 months		2/ 5 mos		4/ 8 mos		2	4/ 8 mos	
	<i>before</i>	<i>after</i>	<i>before</i>	<i>after</i>	<i>before</i>	<i>after</i>	<i>before</i>	<i>before</i>	<i>after</i>
Total Nitrogen	2-3	2-3	2-3	2-3	20-25	5	10	5	5
Total Phosphorus	2.8	0.2-3	0.5*	0.2-3**	2-3	< 1.0	1	2	0.2-2
Chemical savings *w/chemicals **w/o chemicals			\$25,000 / yr projected						
Electrical savings					\$250,000 / yr actual			\$25,000 / yr potential	
Capital Investment Savings					\$4,000,000 Estimated		\$400,000 estimated		
Sludge O & M savings	10% projected		10% projected		10% potential			10% potential	

# Reported Results



**WWTP Electricity Consumption and Charges**





# Early Start

- Baileyton
- Dry Creek
- Collierville
- And others





# Taking Notes

- Montana
- Minnesota
- Kentucky
- EPA Athens





**THANK YOU**

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